

Memorandum

Date: 29 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 4 Data Validation - Level IV Data Deliverable –
Volatile Organic Compounds by EPA Methods 5035/8260B and
5030B/8260B – Eurofins Lancaster Laboratories Sample Delivery
Group (SDG) # NPF01**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of two soil samples and one trip blank, collected on June 10, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by EPA Methods 5035/8260B and 5030B/8260B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data are usable for meeting project objectives.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No. CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Lab ID	Client ID
7087766	TB_061013
7087767	SB02(13-13.5)_061013
7087768	SB01(12.5-13)_061013

The samples were received at the laboratory at temperatures within the criteria of 0-6°C. No sample preservation issues were noted by the laboratory.

1.0 VOLATILE ORGANIC COMPOUNDS

Two soil samples and one trip blank were analyzed for VOCs per EPA Methods 5035/8260B and 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Blank
- ✓ Trip Blank
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio

of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Time

The holding time for a solid sample collected in an Encore or Terracore sampler (before the sample is added to methanol or sodium bisulfate or water) is 48 hours; water preserved soils must be frozen within 48 hours. The holding time for a volatile analysis on a preserved solid sample is 14 days from sample collection. The holding time for a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds or the coefficient of determination (r^2) was greater than or equal to 0.990 for the curve fit calibrations.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance criteria of less than or equal to 20% for CCCs and the validation criteria of 50%D or drift for 1,4-dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported with the data (batches X131651AA and Y131711AA). VOCs were not detected in the method blanks above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were analyzed at the proper frequency for the soil samples analyzed (one pair per batch of 20 samples). A batch MS/MSD pair was reported. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the samples.

MS/MSD pairs were not reported for the aqueous sample; precision and accuracy were assessed using the laboratory control/laboratory control duplicate (LCS/LCSD) pair.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and one LCS/LCSD pair were reported. The results for the LCS and LCS/LCSD pair were within the laboratory specified acceptance criteria for recovery and relative percent difference (RPD).

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Blank

A field blank was not collected with the sample set.

1.11 Trip Blank

A trip blank, TB_061013, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

No field duplicate samples were collected with the sample set.

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Target Compound Identifications

The target compound identifications were within the validation criteria.

1.15 Target Compound Quantitation

The compound quantitations were within the validation criteria.

1.16 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.17 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No other discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 29 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 4 Data Validation - Level IV Data Deliverable –
Volatile Organic Compounds by EPA Methods 5035/8260B and
5030B/8260B – Eurofins Lancaster Laboratories Sample Delivery
Group (SDG) # NPF02**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of five soil samples, one field duplicate sample, one matrix spike/matrix spike duplicate (MS/MSD) pair and one trip blank, collected on June 11, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by EPA Methods 5035/8260B and 5030B/8260B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data are usable for meeting project objectives.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No. CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Lab ID	Client ID
7089163	TB_061113
7089164	SB10(29-29.5)_061113
7089165	SB10(29-29.5)_061113_MS
7089166	SB10(29-29.5)_061113_MSD
7089167	SB09(12.5-13)_061113
7089168	SB08(13-13.5)_061113

Lab ID	Client ID
7089169	SB08(13-13.5)_061113_DUP
7089170	SB07(9.5-10)_061113
7089171	SB06(15-15.5)

The samples were received at the laboratory at temperatures within the criteria of 0-6°C. No sample preservation issues were noted by the laboratory.

Incorrect error corrections were observed on the chain of custody (COC). The proper procedure of a single strike-through correction and initials and date of the person making the correction was not followed.

Sample SB06(15-15.5)_061113 was written in on the COC on 6/14/13 by the laboratory; the Eurofins Lancaster Laboratories Receipt Documentation Log indicated the sample was received and not listed on the COC.

1.0 VOLATILE ORGANIC COMPOUNDS

Five soil samples, one field duplicate sample, one MS/MSD and one trip blank were analyzed for VOCs per EPA Methods 5035/8260B and 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Blank
- ✓ Trip Blank

- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Time

The holding time for a solid sample collected in an Encore or Terracore sampler (before the sample is added to methanol or sodium bisulfate or water) is 48 hours; water preserved soils must be frozen within 48 hours. The holding time for a volatile analysis on a preserved solid sample is 14 days from sample collection. The holding time for a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

It was noted that the sample weight for sample SB10(29-29.5)_061113 was 5.62 grams, outside the laboratory specified weight limits of 4.50-5.50 grams. Based on professional and technical judgment, no qualifications were applied to the data.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance criteria of less than or equal to 20% for CCCs and the validation criteria of 50%D or drift for 1,4-dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds.

1.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported with the data (batches X131651AA and L131681AA). VOCs were not detected in the method blanks above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were analyzed at the proper frequency for the soil samples analyzed (one pair per batch of 20 samples). A sample set specific MS/MSD pair, using sample SB10(29-29.5)_061113, was reported. The MS/MSD pair had recovery and relative percent difference (RPD) results within the laboratory specified acceptance criteria.

MS/MSD pairs were not reported for the aqueous sample; precision and accuracy were assessed using the laboratory control/laboratory control duplicate (LCS/LCSD) pair.

1.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and one LCS/LCSD pair were reported. The results for the LCS and LCS/LCSD pair were within the laboratory specified acceptance criteria for recovery and RPD.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Blank

A field blank was not collected with the sample set.

1.11 Trip Blank

A trip blank, TB_061113, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

One field duplicate sample, SB08(13-13.5)_061113-DUP, was collected with the sample set. Acceptable precision ($\leq 30\%$ RPD) was demonstrated between the field duplicate and the original sample, SB08(13-13.5)_061113.

Sample ID	Compound	Laboratory Concentration ($\mu\text{g/kg}$)	Laboratory Flag	RPD (%)
SB08(13-13.5)_061113	Trichloroethene	3.0 J	NA	0
SB08(13-13.5)_061113-DUP	Trichloroethene	3.0 J	NA	
SB08(13-13.5)_061113	The other VOCs	ND	NA	0
SB08(13-13.5)_061113-DUP	The other VOCs	ND	NA	

J-laboratory flag indicating the result is estimated and $>$ the MDL and $<$ the reporting limit (RL)
ND-not detected at or above the MDL

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Target Compound Identifications

The target compound identifications were within the validation criteria.

1.15 Target Compound Quantitation

The compound quantitations were within the validation criteria.

1.16 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.17 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No other discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 08 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 4 Data Validation - Level IV Data Deliverable –
Volatile Organic Compounds by EPA Methods 5035/8260B and
5030B/8260B – Eurofins Lancaster Laboratories Sample Delivery
Group (SDG) # NPF03**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of three soil samples and one trip blank, collected on June 12, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by EPA Methods 5035/8260B and 5030B/8260B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data are usable for meeting project objectives.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No. CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Lab ID	Client ID
7090841	SB05(12.5-13)_061213
7090842	SB04(9.5-10)_061213
7090843	SB03(12.5-13)_061213

Lab ID	Client ID
7090844	TB_061213

The samples were received at the laboratory at temperatures within the criteria of 0-6°C. No sample preservation issues were noted by the laboratory.

1.0 VOLATILE ORGANIC COMPOUNDS

Three soil samples and one trip blank were analyzed for VOCs per EPA Methods 5035/8260B and 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Blank
- ✓ Trip Blank
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as

estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Time

The holding time for a solid sample collected in an Encore or Terracore sampler (before the sample is added to methanol or sodium bisulfate or water) is 48 hours; water preserved soils must be frozen within 48 hours. The holding time for a volatile analysis on a preserved solid sample is 14 days from sample collection. The holding time for a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance criteria of less than or equal to 20% for CCCs and the validation criteria of 50% D or drift for 1,4-dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported with the data (batches X131651AA and L131681AA). VOCs were not detected in the method blanks above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were analyzed at the proper frequency for the soil samples analyzed (one pair per batch of 20 samples). A batch MS/MSD pair was reported. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the samples.

MS/MSD pairs were not reported for the aqueous sample; precision and accuracy were assessed using the laboratory control/laboratory control duplicate (LCS/LCSD) pair.

1.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and one LCS/LCSD pair were reported. The results for the LCS and LCS/LCSD pair were within the laboratory specified acceptance criteria for recovery and RPD.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Blank

A field blank was not collected with the sample set.

1.11 Trip Blank

A trip blank, TB_061213, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

A field duplicate sample was not collected with the sample set.

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Target Compound Identifications

The target compound identifications were within the validation criteria.

1.15 Target Compound Quantitation

The compound quantitations were within the validation criteria.

1.16 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.17 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No other discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 29 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 2B Data Validation - Level IV Data Deliverable –
Volatile Organic Compounds by EPA Methods 5030B/8260B –
Eurofins Lancaster Laboratories Sample Delivery Group (SDG) #
NPF04**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 2B data validation of five groundwater samples, one field duplicate sample, one matrix spike/matrix spike duplicate (MS/MSD) pair, one trip blank and one field blank, collected on June 17, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by EPA Methods 5030B/8260B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 2B data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for meeting project objectives. Qualified data should be used within the limitations of the qualification.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No. CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-

08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Lab ID	Client ID
7096003	TW20-061713
7096004	TW20-061713 MS
7096005	TW20-061713 MSD
7096006	TW19-061713
7096007	TW19-061713-DUP
7096008	TW21-061713

Lab ID	Client ID
7096009	TW22-061713
7096010	TW24-061713
7096011	TB-061713
7096012	FB-061713

The samples were received at the laboratory at temperatures at 2.7°C, within the criteria of 0-6°C. No sample preservation issues were noted by the laboratory.

1.0 VOLATILE ORGANIC COMPOUNDS

Five water samples, one field duplicate sample, one MS/MSD pair, one trip blank and one field blank were analyzed for VOCs per EPA Methods 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blanks
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ⊗ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Blank
- ✓ Trip Blank
- ⊗ Field Duplicate
- ✓ Internal Standards
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Time

The holding time for a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds or the coefficient of determination (r^2) was greater than or equal to 0.990 for the curve fit calibrations.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance criteria of less than or equal to 20% for CCCs and the validation criteria of 50%D or drift for 1,4-

dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported with the data (batches E131781AA and Y131702AA). VOCs were not detected in the method blanks above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the aqueous samples analyzed (one pair per batch of 20 samples). A sample set specific MS/MSD pair, using sample TW20-061713, was reported. The MS/MSD pair had recovery and relative percent difference (RPD) results within the laboratory specified acceptance criteria, with the following exceptions.

The recoveries of carbon disulfide, cis-1,2-dichloroethene and trichloroethene were low and outside the laboratory specified acceptance criteria. Based on professional judgment, due to the concentrations of cis-1,2-dichloroethene and trichloroethene in sample TW20-061713 relative to the spike concentrations, no qualifications were applied to the cis-1,2-dichloroethene and trichloroethene data. However, the undetected value of carbon disulfide in sample TW20-061713 was UJ qualified as estimated less than the MDL.

Sample ID	Compound	Laboratory Concentration (µg/L)	Laboratory Flag	Validation Concentration (µg/L)	Validation Qualification*	Reason Code**
TW20-061713	Carbon Disulfide	1.0	U	1.0	UJ	4

U-not detected at or above the reported MDL

*Validation qualifiers are defined in Attachment 1 at the end of this report

**EDD reason codes are defined in Attachment 2 at the end of this report

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The results for the LCSs were within the laboratory specified acceptance criteria for recovery, with the following exceptions.

The recoveries of carbon disulfide and 1,4-dioxane were low and outside the laboratory specified acceptance criteria in batch Y131702AA. Therefore, the undetected values of carbon disulfide and 1,4-dioxane in the associated samples were UJ qualified as estimated less than the MDLs.

Sample ID	Compound	Laboratory Concentration (µg/L)	Laboratory Flag	Validation Concentration (µg/L)	Validation Qualification	Reason Code
TW20-061713	Carbon Disulfide	1.0	U	1.0	UJ	5
TW20-061713	1,4-Dioxane	70	U	70	UJ	5
TW19-061713	Carbon Disulfide	5.0	U	5.0	UJ	5
TW19-061713	1,4-Dioxane	350	U	350	UJ	5
TW19-061713-DUP	Carbon Disulfide	5.0	U	5.0	UJ	5
TW19-061713-DUP	1,4-Dioxane	350	U	350	UJ	5
TW21-061713	Carbon Disulfide	1.0	U	1.0	UJ	5
TW21-061713	1,4-Dioxane	70	U	70	UJ	5
TW22-061713	Carbon Disulfide	1.0	U	1.0	UJ	5
TW22-061713	1,4-Dioxane	70	U	70	UJ	5
TW24-061713	Carbon Disulfide	1.0	U	1.0	UJ	5
TW24-061713	1,4-Dioxane	70	U	70	UJ	5
TB-061713	Carbon Disulfide	1.0	U	1.0	UJ	5
TB-061713	1,4-Dioxane	70	U	70	UJ	5
FB-061713	Carbon Disulfide	1.0	U	1.0	UJ	5
FB-061713	1,4-Dioxane	70	U	70	UJ	5

U-not detected at or above the reported MDL

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Blank

A field blank, FB-061713, was collected with the sample set. VOCs were not detected in the field blank above the MDLs.

1.11 Trip Blank

A trip blank, TB-061713, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

One field duplicate sample, TW19-061713-DUP, was collected with the sample set. Acceptable precision ($\leq 25\%$ RPD) was demonstrated between the field duplicate and the original sample, TW19-061713, with the following exception.

1,1-Dichloroethene was detected at an estimated concentration at the MDL in the field duplicate and not detected in the original sample, resulting in a noncalculable RPD between the results. Therefore, the detected concentration of 1,1-dichloroethene was J qualified as estimated and the undetected value was UJ qualified as estimated less than the MDL in the field duplicate pair.

Sample ID	Compound	Laboratory Concentration (µg/L)	Laboratory Flag	RPD (%)	Validation Concentration (µg/L)	Validation Qualification	Reason Code
TW19-061713	1,1-Dichloroethene	4.0	U	NC	4.0	UJ	7
TW19-061713-DUP	1,1-Dichloroethene	4.0	J		4.0	J	7
TW19-061713	cis-1,2-Dichloroethene	410	NA	16	NA	NA	NA
TW19-061713-DUP	cis-1,2-Dichloroethene	480	NA		NA	NA	NA
TW19-061713	trans-1,2-Dichloroethene	5.0	J	NC	NA	NA	NA
TW19-061713-DUP	trans-1,2-Dichloroethene	5.0	J		NA	NA	NA
TW19-061713	Trichloroethene	7200	NA	20	NA	NA	NA
TW19-061713-DUP	Trichloroethene	8800	NA		NA	NA	NA
TW19-061713	The other VOCs	ND	NA	0	NA	NA	NA
TW19-061713-DUP	The other VOCs	ND	NA		NA	NA	NA

U-not detected at the stated MDL

J- laboratory flag indicating an estimated concentration \geq to the MDL and \leq the reporting limit (RL)

NC-not calculable
ND-not detected at or above the MDL
NA-not applicable

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Sensitivity

The samples were reported to the MDLs. Elevated nondetect results were reported for samples TW19-061713 and TW19-061713-DUP due to the dilution analyzed because of the concentrations of target analytes.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No other discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 29 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 4 Data Validation - Level IV Data Deliverable –
Volatile Organic Compounds by EPA Methods 5030B/8260B –
Eurofins Lancaster Laboratories Sample Delivery Group (SDG) #
NPF05**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of eight groundwater samples, one trip blank and one field blank, collected on June 18, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by EPA Methods 5030B/8260B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data are usable for meeting project objectives.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No. CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Lab ID	Client ID
7098787	TB-061813
7098788	TW-13-061813
7098789	TW-14-061813
7098790	TW-15-061813
7098791	TW-16-061813
7098792	TW-17-061813

Lab ID	Client ID
7098793	TW-18-061813
7098794	TW-23-061813
7098795	TW-25-061813
7098796	FB-061813

The samples were received at the laboratory at temperatures within the criteria of 0-6°C. It was noted that the pH of sample 8790 was 4; the chain of custody indicated the samples were acid preserved. Samples received with pH >2 must be analyzed within 7 days of collection. Since the sample was analyzed 3 days after collection, no qualifications were applied to the data. No other sample preservation issues were noted by the laboratory.

1.0 VOLATILE ORGANIC COMPOUNDS

Eight water samples, one trip blank and one field blank were analyzed for VOCs per EPA Methods 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Blank
- ✓ Trip Blank
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity

✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Time

The holding time for a preserved water sample is 14 days from collection to analysis; as noted above, the holding time for a sample with pH >2 is 7 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds or the coefficient of determination (r^2) was greater than or equal to 0.990 for the curve fit calibrations.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance criteria of less than or equal to 20% for CCCs and the validation criteria of 50%D or drift for 1,4-dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported with the data (batch T131721AA). VOCs were not detected in the method blank above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the aqueous samples analyzed (one pair per batch of 20 samples). A batch MS/MSD pair (using sample TW-40-061913, reported in SDG# NPF06) was reported. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the samples.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The results for the LCS were within the laboratory specified acceptance criteria for recovery.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Blank

A field blank, FB-061813, was collected with the sample set. VOCs were not detected in the field blank above the MDLs.

1.11 Trip Blank

A trip blank, TB-061813, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

No field duplicate samples were collected with the sample set.

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Target Compound Identifications

The target compound identifications were within the validation criteria.

1.15 Target Compound Quantitation

The compound quantitations were within the validation criteria.

1.16 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.17 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No other discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 29 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 4 Data Validation - Level IV Data Deliverable –
Volatile Organic Compounds by EPA Methods 5030B/8260B –
Eurofins Lancaster Laboratories Sample Delivery Group (SDG) #
NPF06**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of five groundwater samples, one field duplicate sample, one matrix spike/matrix spike duplicate (MS/MSD) pair, one trip blank and one field blank, collected on June 19, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by EPA Methods 5030B/8260B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data are usable for meeting project objectives.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No. CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Lab ID	Client ID
7099196	TB-061913
7099197	TW40-061913
7099198	TW40-061913MS
7099199	TW40-061913MSD
7099200	TW39-061913
7099201	TW39-061913-DUP

Lab ID	Client ID
7099202	TW36-061913
7099203	TW35-061913
7099204	TW37-061913
7099205	FB-061913

The samples were received at the laboratory at temperatures outside the criteria of 0-6°C. Five temperatures in the cooler were taken; the results ranged from 8.0-9.8°C. The laboratory noted that the samples were received on the same day as sample collection. Based on professional judgment, no qualifications were applied to the data. No other sample preservation issues were noted by the laboratory.

1.0 VOLATILE ORGANIC COMPOUNDS

Five water samples, one field duplicate sample, one MS/MSD pair, one trip blank and one field blank were analyzed for VOCs per EPA Methods 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Blank
- ✓ Trip Blank
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity

✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Time

The holding time for a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds or the coefficient of determination (r^2) was greater than or equal to 0.990 for the curve fit calibrations.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance

criteria of less than or equal to 20% for CCCs and the validation criteria of 50% D or drift for 1,4-dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported with the data (batch T131721AA). VOCs were not detected in the method blank above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the aqueous samples analyzed (one pair per batch of 20 samples). A sample set specific MS/MSD pair, using sample TW-40-061913, was reported. The MS/MSD pair had recovery and relative percent difference (RPD) results within the laboratory specified acceptance criteria, with the following exception. The MS recovery of dichlorodifluoromethane was high and outside the laboratory specified acceptance criteria. Since dichlorodifluoromethane was not detected in sample TW-40-061913, no qualifications were applied to the data.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The results for the LCS were within the laboratory specified acceptance criteria for recovery.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Blank

A field blank, FB-061913, was collected with the sample set. VOCs were not detected in the field blank above the MDLs.

1.11 Trip Blank

A trip blank, TB-061913, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

One field duplicate sample, TW-39-061913-DUP, was collected with the sample set. Acceptable precision ($\leq 25\%$ RPD) was demonstrated between the field duplicate and the original sample, TW-39-061913.

Sample ID	Compound	Laboratory Concentration ($\mu\text{g/L}$)	Laboratory Flag	RPD (%)
TW-39-061913	Trichloroethene	6	NA	0
TW-39-061913-DUP	Trichloroethene	6	NA	
TW-39-061913	The other VOCs	ND	NA	0
TW-39-061913-DUP	The other VOCs	ND	NA	

ND-not detected at or above the MDLL

NA-not applicable

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Target Compound Identifications

The target compound identifications were within the validation criteria.

1.15 Target Compound Quantitation

The compound quantitations were within the validation criteria.

1.16 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.17 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No other discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 29 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 2B Data Validation - Level IV Data Deliverable –
Volatile Organic Compounds by EPA Methods 5030B/8260B –
Eurofins Lancaster Laboratories Sample Delivery Group (SDG) #
NPF07**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 2B data validation of seven groundwater samples, one trip blank and one field blank, collected on June 20, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by EPA Methods 5030B/8260B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 2B data validation covering the quality control (QC) parameters listed below, the data are usable for meeting project objectives.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No. CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Lab ID	Client ID
7100495	TW38-062013
7100496	TB-062013
7100497	TW33-062013
7100498	TW34-062013
7100499	TW31-062013
7100500	TW30-062013

Lab ID	Client ID
7100501	TW26A-062013
7100502	TW27A-062013
7100503	FB-062013

The samples were received at the laboratory at temperatures outside the criteria of 0-6°C. The cooler temperatures ranged from 8.8-13.5°C. The samples were received on the same day as sample collection. Based on professional judgment, no qualifications were applied to the data. No other sample preservation issues were noted by the laboratory.

1.0 VOLATILE ORGANIC COMPOUNDS

Seven water samples, one trip blank and one field blank were analyzed for VOCs per EPA Methods 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Blank
- ✓ Trip Blank
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Time

The holding time for a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds or the coefficient of determination (r^2) was greater than or equal to 0.990 for the curve fit calibrations.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance criteria of less than or equal to 20% for CCCs and the validation criteria of 50%D or drift for 1,4-

dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported with the data (batches T131722AA and T131761AA). VOCs were not detected in the method blanks above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were analyzed at the proper frequency for the aqueous samples analyzed (one pair per batch of 20 samples). A batch MS/MSD pair was reported for batch T131761AA. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the samples.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and one LCS/LCS duplicate (LCSD) pair were reported. The results for the LCS and LCS/LCSD pair were within the laboratory specified acceptance criteria for recovery and relative percent difference (RPD).

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Blank

A field blank, FB-062013, was collected with the sample set. VOCs were not detected in the field blank above the MDLs.

1.11 Trip Blank

A trip blank, TB-062013, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

A field duplicate sample was not collected with the sample set..

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Sensitivity

The samples were reported to the MDLs. Elevated nondetect results were reported for sample TW27A-062013 due to the dilution analyzed because of target analyte concentrations.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No other discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 29 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 2B Data Validation - Level IV Data Deliverable –
Volatile Organic Compounds by EPA Methods 5030B/8260B –
Eurofins Lancaster Laboratories Sample Delivery Group (SDG) #
NPF08**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 2B data validation of one groundwater sample, one trip blank and one field blank, collected on June 21, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by EPA Methods 5030B/8260B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 2B data validation covering the quality control (QC) parameters listed below, the data are usable for meeting project objectives.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No. CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Lab ID	Client ID
7103421	TB_062113
7103422	TW29A_062113
7103423	FB_062113

The samples were received at the laboratory at 4.0°C, within the criteria of 0-6°C. No sample preservation issues were noted by the laboratory.

1.0 VOLATILE ORGANIC COMPOUNDS

One water sample, one trip blank and one field blank were analyzed for VOCs per EPA Methods 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Blank
- ✓ Trip Blank
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as

estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Time

The holding time for a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds or the coefficient of determination (r^2) was greater than or equal to 0.990 for the curve fit calibrations.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance criteria of less than or equal to 20% for CCCs and the validation criteria of 50%D or drift for 1,4-dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported with the data (batch L131791AA). VOCs were not detected in the method blank above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were not reported.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCS duplicate (LCSD) pair was reported. The results for the LCS and LCS/LCSD pair were within the laboratory specified acceptance criteria for recovery and relative percent difference (RPD), with the following exception.

The LCS recovery of methylene chloride was high and outside the laboratory specified acceptance criteria. Since methylene chloride was not detected in the associated samples, no qualifications were applied to the data.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Blank

A field blank, FB-061013, was collected with the sample set. VOCs were not detected in the field blank above the MDLs.

1.11 Trip Blank

A trip blank, TB-062113, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

A field duplicate sample was not collected with the sample set..

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No other discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 29 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 2B and Stage 4 Data Validations - Level IV Data Deliverable – Volatile Organic Compounds by EPA Methods 5030B/8260B, Methane by Method RSKSOP-175, Anions by EPA Method 300.0 and Total and Phenolphthalein Alkalinity by Standard Method 2320B– Eurofins Lancaster Laboratories Sample Delivery Group (SDG) # NPF09**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 2B and Stage 4 data validation of two groundwater samples, one trip blank and one equipment blank, collected on June 24, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. The volatiles data were validated at a Stage 2B level and the other analyses were validated at a Stage 4 level. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by EPA Methods 5030B/8260B
- Methane by modified EPA Method RSKSOP-175, Revision 5
- Anions (chloride, nitrate, nitrite and sulfate) by EPA Method 300.0
- Total and Phenolphthalein Alkalinity by Standard Method 2320B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on the Stage 2B and Stage 4 data validations covering the quality control (QC) parameters listed below, the data are usable for meeting project objectives.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No.

CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The inorganic data were reviewed based on the QAPP, the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, January 2010 (OSWER 9240.1-51, EPA 540-R-10-011), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Lab ID	Client ID
7105336	TB_062413
7105337	TW01_062413
7105338	TW03_062413

Lab ID	Client ID
7105339	EB_062413

The samples were received at the laboratory at 4.0°C, within the criteria of 0-6°C. No sample preservation issues were noted by the laboratory.

The Lancaster Laboratories Receipt Documentation log says “did not receive vials labeled EB-062413 but did receive 2 extra vials labeled TW_03_062413, 6/24/13 1505”. Additional information from the laboratory received by email verified that the two extra vials were logged in as the equipment blank.

It was noted that the VOC methods listed on the chain of custody (COC) were 5030C/SOM1.2. The samples were analyzed for VOCs by EPA methods 5030B/8260B. In addition, the alkalinity method listed on the COC is SM20 4500HB; the samples were analyzed for alkalinity by Standard Method 2320B.

Review of the data package indicated that the analysis times on the methane run log for the initial calibration did not match the analysis times on the initial calibration standards raw data; there was approximately 10 minute differences between the run log times and the analysis times. The laboratory responded that the run log times listed the completion times of the analyses instead of the start times. The laboratory provided a corrected initial calibration run log by email.

1.0 VOLATILE ORGANIC COMPOUNDS

Two groundwater samples, one trip blank and one field blank were analyzed for VOCs per EPA Methods 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Equipment Blank
- ✓ Trip Blank
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Time

The holding time for a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds or the coefficient of determination (r^2) was greater than or equal to 0.990 for the curve fit calibrations.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance criteria of less than or equal to 20% for CCCs and the validation criteria of 50%D or drift for 1,4-dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported with the data (batches L131821AA and Y131821AA). VOCs were not detected in the method blanks above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were not reported.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCS/LCS duplicate (LCSD) pairs were reported. The results for the LCS and LCS/LCSD pair were within the laboratory specified acceptance criteria for recovery and relative percent difference (RPD).

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Equipment Blank

An equipment blank, EB-062413, was collected with the sample set. VOCs were not detected in the equipment blank above the MDLs.

1.11 Trip Blank

A trip blank, TB-062413, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

A field duplicate sample was not collected with the sample set.

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

2.0 METHANE

Two groundwater samples were analyzed for methane by modified EPA Method RSKSOP-175, Revision 5.

The areas of review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were

raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Equipment Blank
- ✓ Field Duplicate
- ✓ Sensitivity
- ✓ Target Compound Quantitations
- ✓ Electronic Data Deliverables Review

2.1 Overall Assessment

The methane data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated or qualified by elevating the detection limits) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

2.2 Holding Times

The holding time for dissolved gases is 14 days from sample collection to analysis. The holding times were met for the sample analyses.

2.3 Initial Calibration

An appropriate initial calibration was performed for methane. The coefficient of determination (r^2) was greater than or equal to 0.990 for the linear curve fit calibration. No initial calibration criteria are listed in the method; based on professional and technical judgment, no qualifications were applied to the data.

2.4 Continuing Calibration Verification

The CCVs were performed at the required frequency. The %Ds were within the method acceptance criteria.

2.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported with the data (batch 131820026A). Methane was not detected in the method blank above the MDL.

2.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

2.7 Laboratory Control Sample

LCS samples were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was analyzed. The result for the LCS was within the laboratory specified acceptance criteria for recovery.

2.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.9 Equipment Blank

An equipment blank was collected with the sample set, but not analyzed for methane.

2.10 Field Duplicate

A field duplicate sample was not collected with the sample set.

2.11 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1b.

2.12 Target Compound Quantitation

The compound quantitations were within the validation criteria.

2.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

3.0 ANIONS AND ALKALINITY

Two groundwater samples were analyzed for anions (chloride, nitrate, nitrite and sulfate) by EPA method 300.0 and total and phenolphthalein alkalinity by Standard Method 2320B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike
- ✓ Laboratory Duplicate
- ✓ Laboratory Control Sample
- ✓ Equipment Blank
- ✓ Field Duplicate
- ✓ Compound Quantitations
- ⊗ Sensitivity
- ✓ Target Compound Quantitations
- ✓ Electronic Data Deliverables Review

3.1 Overall Assessment

The anion and alkalinity data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

3.2 Holding Times

The holding time are listed below. The holding times were met for the sample analyses.

Test Method	Holding Time (from collection to analysis)
Total and phenolphthalein alkalinity	14 days
Sulfate and chloride by EPA Method 300.0	28 days
Nitrate and Nitrite by EPA Method 300.0	48 hours

3.3 Initial Calibration

The initial calibration data for the anions met the method requirements.

3.4 Initial and Continuing Calibration Verification (ICV and CCV)

The percent recoveries in the ICVs and CCVs were within the method acceptance limits.

3.5 Initial and Continuing Calibration Blanks

ICBs and CCBs were analyzed at the proper frequency. The parameters were not detected in the ICBs and CCBs above the MDLs.

3.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank each was reported for the anion and alkalinity data. The anions were not detected in the method blank above the MDLs. An estimated concentration of total alkalinity greater than the MDL and less than the reporting limit (RL) was detected in the method blank. Since the total alkalinity concentrations were greater than the RL and phenolphthalein alkalinity was not detected in the associated samples, no qualifications were applied to the data.

3.7 Matrix Spike

A sample set specific MS, using sample TW01_062413, was reported for the anion data. The MS had recovery results within the laboratory specified acceptance criteria.

3.8 Laboratory Duplicate

A laboratory duplicate, using sample TW01_062413 was reported for the anion data. The laboratory duplicate had RPD results within the laboratory specified acceptance criteria.

3.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS each was reported for the anion and alkalinity data. The results for the LCSs were within the laboratory specified acceptance criteria for recovery.

3.10 Equipment Blank

An equipment blank was collected with the sample set, but not analyzed for anions or alkalinity.

3.11 Field Duplicate

A field duplicate sample was not collected with the sample set.

3.12 Sensitivity

The samples were reported to the MDLs. Elevated nondetect results were reported for nitrite due to the dilutions analyzed because of the concentrations of chloride and sulfate in the samples.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1b, with the exception of alkalinity. The achievable laboratory MDLs listed in QAPP Table 1b for alkalinity was 0.01 mg/L as CaCO₃; the laboratory MDL was 0.70 mg/L as CaCO₃.

3.13 Target Compound Quantitation

The compound quantitations were within the validation criteria.

3.14 Electronic Data Deliverables Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 30 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 2B Data Validation - Level IV Data Deliverable – Volatile Organic Compounds by EPA Methods 5030B/8260B, Methane by Method RSKSOP-175, Anions by EPA Method 300.0 and Total and Phenolphthalein Alkalinity by Standard Method 2320B – Eurofins Lancaster Laboratories Sample Delivery Group (SDG) # NPF10**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 2B data validation of four groundwater samples, one matrix spike/matrix spike duplicate (MS/MSD) pair, one trip blank and one equipment blank, collected on June 25, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by EPA Methods 5030B/8260B
- Methane by modified EPA Method RSKSOP-175, Revision 5
- Anions (chloride, nitrate, nitrite and sulfate) by EPA Method 300.0
- Total and Phenolphthalein Alkalinity by Standard Method 2320B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 2B data validation covering the quality control (QC) parameters listed below, the data are usable for meeting project objectives.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No.

CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The inorganic data were reviewed based on the QAPP, the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, January 2010 (OSWER 9240.1-51, EPA 540-R-10-011), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Lab ID	Client ID
7106955	TB_062513
7106956	TW02_062513
7106957	TW11_062513
7106958	TW11_062513MS
7106959	TW11_062513MSD
7106960	TW12_062513

Lab ID	Client ID
7106961	TW12_062513_DUP
7106962	TW05_062513
7106963	EB_062513

The samples were received at the laboratory at 1.3°C, within the criteria of 0-6°C. No sample preservation issues were noted by the laboratory.

It was noted that the VOC methods listed on the chain of custody (COC) were 5030C/SOM1.2. The samples were analyzed for VOCs by EPA methods 5030B/8260B. In addition, the alkalinity method listed on the COC is SM20 4500HB; the samples were analyzed for alkalinity by Standard Method 2320B.

Nitrate and nitrite were not reported for sample TW02_062513 as requested on the COC. Additional information from the laboratory received by email indicated that the holding times for nitrate and nitrite were missed for this sample, so it was recollected on 6/28/13 and reported in laboratory report NPF13.

Review of the data package indicated that the analysis times on the methane run log for the initial calibration did not match the analysis times on the initial calibration standards raw data; there were approximately 10 minute differences between the run log times and the analysis times. The laboratory responded that the run log times listed the completion times of the analyses instead of the start times. The laboratory provided a corrected initial calibration run log by email.

1.0 VOLATILE ORGANIC COMPOUNDS

Four groundwater samples, one MS/MSD pair, one trip blank and one equipment blank were analyzed for VOCs per EPA Methods 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Equipment Blank
- ✓ Trip Blank
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Time

The holding time for a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds or the coefficient of determination (r^2) was greater than or equal to 0.990 for the curve fit calibrations.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance criteria of less than or equal to 20% for CCCs and the validation criteria of 50%D or drift for 1,4-dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported with the data (batch T131822AA). VOCs were not detected in the method blank above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one pair per batch of 20 samples). A sample set specific MS/MSD pair, using sample

TW11_062513, was reported. The MS/MSD pair had recovery and relative percent difference (RPD) results within the laboratory specified acceptance criteria.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The results for the LCS were within the laboratory specified acceptance criteria for recovery.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Equipment Blank

An equipment blank, EB_062513, was collected with the sample set. VOCs were not detected in the equipment blank above the MDLs.

1.11 Trip Blank

A trip blank, TB_062513, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

One field duplicate sample, TW12_062513_DUP, was collected with the sample set. Acceptable precision ($\leq 25\%$ RPD) was demonstrated between the field duplicate and the original sample, TW12_062513.

Sample ID	Compound	Laboratory Concentration (µg/L)	Laboratory Flag	RPD (%)
TW12_062513	Trichloroethene	3.0	J	NC
TW12_062513_DUP	Trichloroethene	3.0	J	
TW12_062513	The other VOCs	ND	NA	0
TW12_062513_DUP	The other VOCs	ND	NA	

J-estimated concentration less than the reporting limit (RL) and greater than the MDL

ND-not detected at or above the MDL

NC-not calculable

NA-not applicable

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

2.0 METHANE

Two groundwater samples were analyzed for methane by modified EPA Method RSKSOP-175, Revision 5.

The areas of review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Equipment Blank
- ✓ Field Duplicate
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

2.1 Overall Assessment

The methane data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated or qualified by elevating the detection limits) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

2.2 Holding Times

The holding time for dissolved gases is 14 days from sample collection to analysis. The holding times were met for the sample analyses.

2.3 Initial Calibration

An appropriate initial calibration was performed for methane. The coefficient of determination (r^2) was greater than or equal to 0.990 for the linear curve fit calibration. No initial calibration criteria are listed in the method; based on professional and technical judgment, no qualifications were applied to the data.

2.4 Continuing Calibration Verification

The CCVs were performed at the required frequency. The %Ds for methane were within the method acceptance criteria.

2.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported with the data (batch 131820026A). Methane was not detected in the method blank above the MDL.

2.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the samples analyzed (one pair per batch of 20 samples). A batch MS/MSD pair was reported. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the samples.

2.7 Laboratory Control Sample

LCS samples were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was analyzed. The result for the LCS was within the laboratory specified acceptance criteria for recovery.

2.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria

2.9 Equipment Blank

An equipment blank was collected with the sample set, but not analyzed for methane.

2.10 Field Duplicate

A field duplicate sample was collected with the sample set, but not analyzed for methane.

2.11 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1b.

2.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

3.0 ANIONS AND ALKALINITY

One groundwater sample was analyzed for anions (chloride, nitrate, nitrite and sulfate) and one sample was analyzed for only chloride and sulfate by EPA method 300.0 and two groundwater samples were analyzed for total and phenolphthalein alkalinity by Standard Method 2320B. As noted above in the executive summary, nitrate and nitrite were not reported in sample TW02_062513 as requested on the COC. Additional information from the laboratory indicated that the holding time was missed for this sample, so it was recollected on 6/28/13 and reported in laboratory report NPF13.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike
- ✓ Laboratory Duplicate
- ✓ Laboratory Control Sample
- ✓ Equipment Blank
- ✓ Field Duplicate
- ✓ Compound Quantitations
- ⊗ Sensitivity
- ✓ Electronic Data Deliverables Review

3.1 Overall Assessment

The anion and alkalinity data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

3.2 Holding Times

The holding time are listed below. The holding times were met for the sample analyses.

Test Method	Holding Time (from collection to analysis)
Total and phenolphthalein alkalinity	14 days
Sulfate and chloride by EPA Method 300.0	28 days
Nitrate and Nitrite by EPA Method 300.0	48 hours

3.3 Initial Calibration

The initial calibration data for the anions met the method requirements.

3.4 Initial and Continuing Calibration Verification (ICV and CCV)

The percent recoveries in the ICVs and CCVs were within the method acceptance limits.

3.5 Initial and Continuing Calibration Blanks

ICBs and CCBs were analyzed at the proper frequency. The parameters were not detected in the ICBs and CCBs above the MDLs.

3.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank each was reported for the anion and alkalinity data. The anions were not detected in the method blank above the MDLs. An estimated concentration of total alkalinity greater than the MDL and less than the reporting limit (RL) was detected in the method blank. Since the total alkalinity concentrations were greater than the RL and phenolphthalein alkalinity was not detected in the associated samples, no qualifications were applied to the data.

3.7 Matrix Spike

A batch MS each was reported for the anions and alkalinity. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the samples.

3.8 Laboratory Duplicate

A batch laboratory duplicate each was reported for the anions and alkalinity. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the samples.

3.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS each was reported for the anion and alkalinity data. The results for the LCSs were within the laboratory specified acceptance criteria for recovery.

3.10 Equipment Blank

An equipment blank was collected with the sample set, but not analyzed for anions or alkalinity.

3.11 Field Duplicate

A field duplicate sample was collected with the sample set, but not analyzed for anions or alkalinity.

3.12 Sensitivity

The samples were reported to the MDLs. Elevated nondetect results were reported for nitrite due to the dilutions analyzed because of the concentrations of chloride and sulfate in the samples.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1b, with the exception of alkalinity. The achievable laboratory MDLs listed in QAPP Table 1b for alkalinity was 0.01 mg/L as CaCO₃; the laboratory MDL was 0.7 mg/L as CaCO₃.

3.13 Electronic Data Deliverables Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 30 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 2B Data Validation - Level IV Data Deliverable – Volatile Organic Compounds by EPA Methods 5030B/8260B, Methane by Method RSKSOP-175, Anions by EPA Method 300.0 and Total and Phenolphthalein Alkalinity by Standard Method 2320B– Eurofins Lancaster Laboratories Sample Delivery Group (SDG) # NPF11**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 2B data validation of five groundwater samples, one trip blank and one equipment blank, collected on June 26, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by EPA Methods 5030B/8260B
- Methane by modified EPA Method RSKSOP-175, Revision 5
- Anions (chloride, nitrate, nitrite and sulfate) by EPA Method 300.0
- Total and Phenolphthalein Alkalinity by Standard Method 2320B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 2B data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for meeting project objectives. Qualified data should be used within the limitations of the qualification.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No.

CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The inorganic data were reviewed based on the QAPP, the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, January 2010 (OSWER 9240.1-51, EPA 540-R-10-011), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Lab ID	Client ID
7108405	TB_062613
7108406	EB_062613
7108407	TW04_062613
7108408	TW06_062613
7108409	TW07_062613

Lab ID	Client ID
7108410	TW09_062313
7108411	TW08_062613

The samples were received at the laboratory at 5.5°C, within the criteria of 0-6°C. No sample preservation issues were noted by the laboratory.

It was noted that the VOC methods listed on the chain of custody (COC) were 5030C/SOM1.2. The samples were analyzed for VOCs by EPA methods 5030B/8260B. In addition, the alkalinity method listed on the COC is SM20 4500HB; the samples were analyzed for alkalinity by Standard Method 2320B.

Review of the data package indicated that the analysis times on the methane run log for the initial calibration did not match the analysis times on the initial calibration standards raw data; there was approximately 10 minute differences between the run log times and the analysis times. The laboratory responded that the run log times listed the completion times of the analyses instead of the start times. The laboratory provided a corrected initial calibration run log by email.

1.0 VOLATILE ORGANIC COMPOUNDS

Five groundwater samples, one trip blank and one equipment blank were analyzed for VOCs per EPA Methods 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues

were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Equipment Blank
- ✓ Trip Blank
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Time

The holding time for a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds or the coefficient of determination (r^2) was greater than or equal to 0.990 for the curve fit calibrations.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance criteria of less than or equal to 20% for CCCs and the validation criteria of 50%D or drift for 1,4-dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds, with the following exceptions.

The %Ds for 4-methyl-2-pentanone and 2-hexanone in the CCV analyzed on 6/30/13 were high and outside the validation acceptance criteria. However, since the biases were high and 4-methyl-2-pentanone and 2-hexanone were not detected in the associated samples, no qualifications were applied to the data.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported with the data (batches N131811AA and N131841AA). VOCs were not detected in the method blanks above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one pair per batch of 20 samples). Two batch MS/MSD pairs were reported. Since

these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the samples.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The results for the LCSs were within the laboratory specified acceptance criteria for recovery.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Equipment Blank

An equipment blank, EB_062613, was collected with the sample set. VOCs were not detected in the equipment blank above the MDLs.

1.11 Trip Blank

A trip blank, TB_062613, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

A field duplicate sample was not collected with the sample set.

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

2.0 METHANE

Four groundwater samples were analyzed for methane by modified EPA Method RSKSOP-175, Revision 5.

The areas of review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Equipment Blank
- ✓ Field Duplicate
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

2.1 Overall Assessment

The methane data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated or qualified by elevating the detection limits) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

2.2 Holding Times

The holding time for dissolved gases is 14 days from sample collection to analysis. The holding times were met for the sample analyses.

2.3 Initial Calibration

An appropriate initial calibration was performed for methane. The coefficient of determination (r^2) was greater than or equal to 0.990 for the linear curve fit calibration. No initial calibration criteria are listed in the method; based on professional and technical judgment, no qualifications were applied to the data.

2.4 Continuing Calibration Verification

The CCVs were performed at the required frequency. The %Ds for methane were within the method acceptance criteria.

2.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported with the data (batch 131820026A). Methane was not detected in the method blank above the MDL.

2.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the samples analyzed (one pair per batch of 20 samples). A batch MS/MSD pair was reported. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the samples.

2.7 Laboratory Control Sample

LCS samples were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was analyzed. The result for the LCS was within the laboratory specified acceptance criteria for recovery.

2.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria

2.9 Equipment Blank

An equipment blank was collected with the sample set, but not analyzed for methane.

2.10 Field Duplicate

A field duplicate sample was not collected with the sample set.

2.11 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1b.

2.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

3.0 ANIONS AND ALKALINITY

Four groundwater samples were analyzed for anions (chloride, nitrate, nitrite and sulfate) by EPA method 300.0 and total and phenolphthalein alkalinity by Standard Method 2320B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike
- ⊗ Laboratory Duplicate
- ✓ Laboratory Control Sample
- ✓ Equipment Blank
- ✓ Field Duplicate
- ✓ Compound Quantitations
- ⊗ Sensitivity
- ✓ Electronic Data Deliverables Review

3.1 Overall Assessment

The anion and alkalinity data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified

as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

3.2 Holding Times

The holding time are listed below. The holding times were met for the sample analyses.

Test Method	Holding Time (from collection to analysis)
Total and phenolphthalein alkalinity	14 days
Sulfate and chloride by EPA Method 300.0	28 days
Nitrate and Nitrite by EPA Method 300.0	48 hours

3.3 Initial Calibration

The initial calibration data for the anions met the method requirements.

3.4 Initial and Continuing Calibration Verification (ICV and CCV)

The percent recoveries in the ICVs and CCVs were within the method acceptance limits.

3.5 Initial and Continuing Calibration Blanks

ICBs and CCBs were analyzed at the proper frequency. The parameters were not detected in the ICBs and CCBs above the MDLs.

3.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank each was reported for the anion and alkalinity data. The anions were not detected in the method blank above the MDLs. An estimated concentration of total alkalinity greater than the MDL and less than the reporting limit (RL) was detected in the method blank. Since the total alkalinity concentrations were greater than the RL and phenolphthalein alkalinity was not detected in the associated samples, no qualifications were applied to the data.

3.7 Matrix Spike

MSs were analyzed at the proper frequency for the samples analyzed (one per batch of 20 samples). Sample set specific MSs, using samples TW06_062613 for anions and TW07_062613

for alkalinity, were reported. The MSs had recovery results within the laboratory specified acceptance criteria.

3.8 Laboratory Duplicate

Laboratory duplicates were analyzed at the proper frequency for the samples analyzed (one per batch of 20 samples). Sample set specific laboratory duplicates, using samples TW06_062613 for anions and TW07_062613 for alkalinity, were reported. The anion laboratory duplicate had relative percent difference (RPD) results within the laboratory specified acceptance criteria. The alkalinity RPD was high and outside the laboratory specified acceptance criteria. Therefore, based on professional judgment, the total alkalinity concentration in sample TW07_062613 was J qualified as estimated; since phenolphthalein alkalinity was not detected in sample TW07_062613, no qualifications were applied to the phenolphthalein alkalinity.

Sample ID	Compound	Laboratory Concentration (mg/L)	Laboratory Flag	Validation Concentration (mg/L)	Validation Qualification*	Reason Code**
TW07_062613	Total Alkalinity	8.0	NA	8.0	J	12

NA-not applicable

*Validation qualifiers are defined in Attachment 1 at the end of this report

**EDD reason codes are defined in Attachment 2 at the end of this report

3.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS each was reported for the anion and alkalinity data. The results for the LCSs were within the laboratory specified acceptance criteria for recovery.

3.10 Equipment Blank

An equipment blank was collected with the sample set, but not analyzed for anions or alkalinity.

3.11 Field Duplicate

A field duplicate sample was not collected with the sample set.

3.12 Sensitivity

The samples were reported to the MDLs. Elevated nondetect results were reported for nitrite due to the dilutions analyzed because of the concentrations of chloride and sulfate in the samples.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1b, with the exception of alkalinity. The achievable laboratory MDLs listed in QAPP Table 1b for alkalinity was 0.01 mg/L as CaCO₃; the laboratory MDL was 0.7 mg/L as CaCO₃.

3.13 Electronic Data Deliverables Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 30 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 2B Data Validation - Level IV Data Deliverable – Volatile Organic Compounds by EPA Methods 5030B/8260B, Methane by Method RSKSOP-175, Anions by EPA Method 300.0 and Total and Phenolphthalein Alkalinity by Standard Method 2320B – Eurofins Lancaster Laboratories Sample Delivery Group (SDG) # NPF12**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 2B data validation of two groundwater samples, one trip blank and one equipment blank, collected on June 27, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by EPA Methods 5030B/8260B
- Methane by modified EPA Method RSKSOP-175, Revision 5
- Anions (chloride, nitrate, nitrite and sulfate) by EPA Method 300.0
- Total and Phenolphthalein Alkalinity by Standard Method 2320B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 2B data validation covering the quality control (QC) parameters listed below, the data are usable for meeting project objectives.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No. CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National

Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The inorganic data were reviewed based on the QAPP, the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, January 2010 (OSWER 9240.1-51, EPA 540-R-10-011), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Lab ID	Client ID
7110408	TB_062713
7110409	EB_062713
7110411	TW04_062713

Lab ID	Client ID
7110412	RI29_062713

The samples were received at the laboratory at 1.7°C, within the criteria of 0-6°C. No sample preservation issues were noted by the laboratory.

Sample EB_062413 was listed on the chain of custody (COC). This sample was analyzed and reported in laboratory report NPF09.

It was noted that the VOC methods listed on the COC were 5030C/SOM1.2. The samples were analyzed for VOCs by EPA methods 5030B/8260B. In addition, the alkalinity method listed on the COC is SM20 4500HB; the samples were analyzed for alkalinity by Standard Method 2320B.

Review of the data package indicated that the analysis times on the methane run log for the initial calibration did not match the analysis times on the initial calibration standards raw data; there was approximately 10 minute differences between the run log times and the analysis times. The laboratory responded that the run log times listed the completion times of the analyses instead of the start times. The laboratory provided a corrected initial calibration run log by email.

1.0 VOLATILE ORGANIC COMPOUNDS

One groundwater sample, one trip blank and one equipment blank were analyzed for VOCs per EPA Methods 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues

were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Equipment Blank
- ✓ Trip Blank
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Time

The holding time for a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds or the coefficient of determination (r^2) was greater than or equal to 0.990 for the curve fit calibrations.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance criteria of less than or equal to 20% for CCCs and the validation criteria of 50%D or drift for 1,4-dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported with the data (batch L131821AA). VOCs were not detected in the method blank above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were not reported.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCS duplicate (LCSD) pair was reported. The results for the LCS/LCSD pair were within the laboratory specified acceptance criteria for recovery and relative percent difference (RPD).

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Equipment Blank

An equipment blank, EB_062713, was collected with the sample set. VOCs were not detected in the equipment blank above the MDLs.

1.11 Trip Blank

A trip blank, TB_062713, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

A field duplicate sample was not collected with the sample set.

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

2.0 METHANE

One groundwater sample was analyzed for methane by modified EPA Method RSKSOP-175, Revision 5.

The areas of review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were

raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Equipment Blank
- ✓ Field Duplicate
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

2.1 Overall Assessment

The methane data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated or qualified by elevating the detection limits) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

2.2 Holding Times

The holding time for dissolved gases is 14 days from sample collection to analysis. The holding times were met for the sample analyses.

2.3 Initial Calibration

An appropriate initial calibration was performed for methane. The coefficient of determination (r^2) was greater than or equal to 0.990 for the linear curve fit calibration. No initial calibration criteria are listed in the method; based on professional and technical judgment, no qualifications were applied to the data.

2.4 Continuing Calibration Verification

The CCVs were performed at the required frequency. The %Ds for methane were within the method acceptance criteria.

2.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported with the data (batch 131900024A). Methane was not detected in the method blank above the MDL.

2.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the samples analyzed (one pair per batch of 20 samples). A batch MS/MSD pair was reported. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the samples.

2.7 Laboratory Control Sample

LCS samples were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was analyzed. The result for the LCS was within the laboratory specified acceptance criteria for recovery.

2.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria

2.9 Equipment Blank

An equipment blank was collected with the sample set, but not analyzed for methane.

2.10 Field Duplicate

A field duplicate sample was not collected with the sample set.

2.11 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1b.

2.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

3.0 ANIONS AND ALKALINITY

One groundwater sample was analyzed for anions (chloride, nitrate, nitrite and sulfate) by EPA method 300.0 and total and phenolphthalein alkalinity by Standard Method 2320B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike
- ✓ Laboratory Duplicate
- ✓ Laboratory Control Sample
- ✓ Equipment Blank
- ✓ Field Duplicate
- ✓ Compound Quantitations
- ⊗ Sensitivity
- ✓ Electronic Data Deliverables Review

3.1 Overall Assessment

The anion and alkalinity data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

3.2 Holding Times

The holding time are listed below. The holding times were met for the sample analyses.

Test Method	Holding Time (from collection to analysis)
Total and phenolphthalein alkalinity	14 days
Sulfate and chloride by EPA Method 300.0	28 days
Nitrate and Nitrite by EPA Method 300.0	48 hours

3.3 Initial Calibration

The initial calibration data for the anions met the method requirements.

3.4 Initial and Continuing Calibration Verification (ICV and CCV)

The percent recoveries in the ICVs and CCVs were within the method acceptance limits.

3.5 Initial and Continuing Calibration Blanks

ICBs and CCBs were analyzed at the proper frequency. The parameters were not detected in the ICBs and CCBs above the MDLs.

3.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank each was reported for the anion and alkalinity data. The anions were not detected in the method blank above the MDLs. An estimated concentration of total alkalinity greater than the MDL and less than the reporting limit (RL) was detected in the method blank. Since the total alkalinity concentrations were greater than the RL and phenolphthalein alkalinity was not detected in the associated samples, no qualifications were applied to the data.

3.7 Matrix Spike

MSs were analyzed at the proper frequency for the samples analyzed (one per batch of 20 samples). A sample set specific MS, using sample TW04_062713 for anions, was reported. The MS had recovery results within the laboratory specified acceptance criteria.

A batch MS was reported for alkalinity. Since this is batch QC, the result does not affect the sample in this data set and qualifications were not applied to the sample.

3.8 Laboratory Duplicate

Laboratory duplicates were analyzed at the proper frequency for the samples analyzed (one per batch of 20 samples). A sample set specific laboratory duplicate, using sample TW04_062713 for anions, was reported. The anion laboratory duplicate had relative percent difference (RPD) results within the laboratory specified acceptance criteria. A batch laboratory duplicate reported for alkalinity. Since this is batch QC, the result does not affect the sample in this data set and qualifications were not applied to the sample.

3.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCSD pair and one LCS were reported for the anion and alkalinity data, respectively. The results for the LCS/LCSD pair and LCS were within the laboratory specified acceptance criteria for recovery and RPD.

3.10 Equipment Blank

An equipment blank was collected with the sample set, but not analyzed for anions or alkalinity.

3.11 Field Duplicate

A field duplicate sample was not collected with the sample set.

3.12 Sensitivity

The samples were reported to the MDLs. Elevated nondetect results were reported for nitrite due to the dilutions analyzed because of the concentrations of chloride and sulfate in the samples.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1b, with the exception of alkalinity. The achievable laboratory MDLs listed in QAPP Table 1b for alkalinity was 0.01 mg/L as CaCO₃; the laboratory MDL was 0.7 mg/L as CaCO₃.

3.13 Electronic Data Deliverables Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 31 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 2B Data Validation - Level IV Data Deliverable –
Volatile Organic Compounds by EPA Methods 5030B/8260B,
Toxicity Characteristic Leaching Procedure Volatile Organic
Compounds by EPA Methods 1311/5030B/8260B and Anions by
EPA Method 300.0 – Eurofins Lancaster Laboratories Sample
Delivery Group (SDG) # NPF13**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 2B data validation of seven groundwater samples, one liquid sample, one solid sample, one trip blank and one equipment blank, collected on June 28, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by EPA Methods 5030B/8260B
- Toxicity Characteristic Leaching Procedure (TCLP) VOCs by EPA Methods 1311/5030B/8260B
- Anions (chloride, nitrate, nitrite and sulfate) by EPA Method 300.0

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 2B data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for meeting project objectives, with the following exceptions. Qualified data should be used within the limitations of the qualification.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No. CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The inorganic data were reviewed based on the QAPP, the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, January 2010 (OSWER 9240.1-51, EPA 540-R-10-011), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Lab ID	Client ID
7112310	TB_062813
7112311	EB_062813
7112312	TW02_062813
7112313	Liquid IDW_062813
7112314	Solid IDW_062813
7112315	TW10_062813
7112316	RI30_062813

Lab ID	Client ID
7112317	RI24_062813
7112318	RI25_062813
7112319	RI23_062813
7112320	RI28_062813

The samples were received at the laboratory at 2.7°C, within the criteria of 0-6°C. No sample preservation issues were noted by the laboratory.

It was noted that the VOC methods listed on the chain of custody (COC) were 5030C/SOM1.2. The samples were analyzed for VOCs by EPA methods 5030B/8260B.

Review of the data package indicated that the missed holding time for the TCLP extraction of sample Liquid IDW_062813 was not noted in the narrative; in addition, the raw data for the VOC analysis of sample Liquid IDW_062813 was missing. A request was made to the laboratory to revise the laboratory report to correct the narrative and to include the missing raw data.

1.0 VOLATILE ORGANIC COMPOUNDS

Six groundwater sample, one trip blank and one equipment blank were analyzed for VOCs per EPA Methods 5030B/8260B and one liquid sample and one solid sample were analyzed for TCLP VOCs by EPA Methods 1311/5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ⊗ Overall Assessment
- ⊗ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Equipment Blank
- ✓ Trip Blank
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid with the exception noted below. The analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 98%.

The COC indicated that sample Liquid IDW_062813 (for TCLP VOC analysis) was preserved with hydrochloric acid (HCl). Method 1311 indicates that preservation should not be added to samples prior to TCLP extraction. Therefore, based on professional and technical judgment, the undetected values of the TCLP compounds in sample Liquid IDW_062813 were R qualified as rejected and the detected concentration was J qualified as estimated. Additionally the holding time for the TCLP analysis was missed (Section 1.2 below); therefore, based on these two factors, the results are not considered representative of the sample matrix.

Sample ID	Compound	Laboratory Concentration (mg/L)	Laboratory Flag	Validation Concentration (mg/L)	Validation Qualification*	Reason Code**
Liquid IDW_062813	Vinyl Chloride	0.020	U	0.020	R	1
Liquid IDW_062813	1,1-Dichloroethene	0.016	U	0.016	R	1
Liquid IDW_062813	Chloroform	0.016	U	0.016	R	1
Liquid IDW_062813	Carbon Tetrachloride	0.020	U	0.020	R	1
Liquid IDW_062813	Benzene	0.010	U	0.010	R	1
Liquid IDW_062813	1,2-Dichloroethane	0.020	U	0.020	R	1
Liquid IDW_062813	Trichloroethene	0.037	J	0.037	J	1
Liquid IDW_062813	Tetrachloroethene	0.016	U	0.016	R	1
Liquid IDW_062813	Chlorobenzene	0.016	U	0.016	R	1
Liquid IDW_062813	2-Butanone	0.060	U	0.060	R	1

U-not detected at or above the reported MDL

J-laboratory flag indicating an estimated concentration \geq the MDL and $<$ the reporting limit (RL)

*Validation qualifiers are defined in Attachment 1 at the end of this report

**EDD reason codes are defined in Attachment 2 at the end of this report

1.2 Holding Time

The holding time for a preserved water sample is 14 days from collection to analysis. The holding times for the TCLP VOC analysis of samples are 14 days from collection to TCLP extraction and then 14 days from TCLP extraction to analysis. The holding times were met for the sample analyses, with the following exception.

The TCLP extraction of sample Liquid IDW_062813 was done 4 days past the 14 day holding time. However, since the undetected values were R qualified as rejected and the detected concentration was J qualified as estimated due to the unacceptable preservation of the sample, no additional qualifications were applied to the data.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds or the coefficient of determination (r^2) was greater than or equal to 0.990 for the curve fit calibrations.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance criteria of less than or equal to 20% for CCCs and the validation criteria of 50%D or drift for 1,4-dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds, with the following exceptions.

The %Ds for 4-methyl-2-pentanone and 2-hexanone in the CCV analyzed on 7/4/13 and 1,1,1-trichloroethane and 1,2-dichloroethane in the CCV analyzed on 7/15/13 were high and outside the validation acceptance criteria. However, since the biases were high and these compounds were not detected in the associated samples, no qualifications were applied to the data.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported with the data (batches N131852AA, N131962AA and W131822AA). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one pair per batch of 20 samples). Three batch MS/MSD pairs were reported. Since

these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the samples.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCS duplicate (LCSD) pair and two LCSs were reported. The results for the LCS/LCSD pair and the LCSs were within the laboratory specified acceptance criteria for recovery and relative percent difference (RPD).

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Equipment Blank

An equipment blank, EB_062813, was collected with the sample set. VOCs were not detected in the equipment blank above the MDLs.

1.11 Trip Blank

A trip blank, TB_062813, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

A field duplicate sample was not collected with the sample set.

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. It was not noted in the EDD that the TCLP results for samples Liquid IDW_062813 and Solid IDW_062813 were from a TCLP extraction. No other discrepancies were identified between the level IV report and the EDD.

2.0 ANIONS

One groundwater sample was analyzed for anions (chloride, nitrate, nitrite and sulfate) by EPA method 300.0.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike
- ✓ Laboratory Duplicate
- ✓ Laboratory Control Sample
- ✓ Equipment Blank
- ✓ Field Duplicate
- ✓ Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

2.1 Overall Assessment

The anion data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

2.2 Holding Times

The holding time are listed below. The holding times were met for the sample analyses.

Test Method	Holding Time (from collection to analysis)
Sulfate and chloride by EPA Method 300.0	28 days
Nitrate and Nitrite by EPA Method 300.0	48 hours

2.3 Initial Calibration

The initial calibration data for the anions met the method requirements.

2.4 Initial and Continuing Calibration Verification (ICV and CCV)

The percent recoveries in the ICVs and CCVs were within the method acceptance limits.

2.5 Initial and Continuing Calibration Blanks

ICBs and CCBs were analyzed at the proper frequency. The parameters were not detected in the ICBs and CCBs above the MDLs.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported for the anion data. The anions were not detected in the method blank above the MDLs.

2.7 Matrix Spike

MSs were analyzed at the proper frequency for the samples analyzed (one per batch of 20 samples). A batch MS was reported for the anions. Since this is batch QC, the results do not affect the sample in this data set and qualifications were not applied to the sample.

2.8 Laboratory Duplicate

Laboratory duplicates were analyzed at the proper frequency for the samples analyzed (one per batch of 20 samples). A batch laboratory duplicate reported for the anions. Since this is batch QC, the results do not affect the sample in this data set and qualifications were not applied to the sample.

2.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported for the anion data. The results for the LCS were within the laboratory specified acceptance criteria for recovery.

2.10 Equipment Blank

An equipment blank was collected with the sample set, but not analyzed for anions.

2.11 Field Duplicate

A field duplicate sample was not collected with the sample set.

2.12 Sensitivity

The samples were reported to the MDLs. An elevated nondetect result was reported for nitrite due to the dilution analyzed because of the concentrations of chloride and sulfate in the sample.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1b.

2.13 Electronic Data Deliverables Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 30 July 2013
To: Derek Tomlinson
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 2B Data Validation - Level IV Data Deliverable –
Methane by Method RSKSOP-175, Anions by EPA Method 300.0
and Total and Phenolphthalein Alkalinity by Standard Method
2320B – Eurofins Lancaster Laboratories Sample Delivery Group
(SDG) # NPF14**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 2B data validation of one groundwater sample, collected on July 1, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical tests:

- Methane by modified EPA Method RSKSOP-175, Revision 5
- Anions (chloride, nitrate, nitrite and sulfate) by EPA Method 300.0
- Total and Phenolphthalein Alkalinity by Standard Method 2320B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 2B data validation covering the quality control (QC) parameters listed below, the data are usable for meeting project objectives.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No. CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-

08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The inorganic data were reviewed based on the QAPP, the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, January 2010 (OSWER 9240.1-51, EPA 540-R-10-011), as well as by the pertinent methods referenced by the data package and professional judgment.

The following sample was analyzed in the data set:

Lab ID	Client ID
7115134	TW10_070113

The sample was received at the laboratory at 2.6°C, within the criteria of 0-6°C. No sample preservation issues were noted by the laboratory.

It was noted that the alkalinity method listed on the chain of custody (COC) is SM20 4500HB; the samples were analyzed for alkalinity by Standard Method 2320B.

Review of the data package indicated that the analysis times on the methane run log for the initial calibration did not match the analysis times on the initial calibration standards raw data; there was approximately 10 minute differences between the run log times and the analysis times. The laboratory responded that the run log times listed the completion times of the analyses instead of the start times. The laboratory provided a corrected initial calibration run log by email.

1.0 METHANE

One groundwater sample was analyzed for methane by modified EPA Method RSKSOP-175, Revision 5.

The areas of review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate

- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Equipment Blank
- ✓ Field Duplicate
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The methane data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated or qualified by elevating the detection limits) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Times

The holding time for dissolved gases is 14 days from sample collection to analysis. The holding times were met for the sample analyses.

1.3 Initial Calibration

An appropriate initial calibration was performed for methane. The coefficient of determination (r^2) was greater than or equal to 0.990 for the linear curve fit calibration. No initial calibration criteria are listed in the method; based on professional and technical judgment, no qualifications were applied to the data.

1.4 Continuing Calibration Verification (CCV)

The CCVs were performed at the required frequency. The %Ds for methane were within the method acceptance criteria.

1.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported with the data (batch 131900024A). Methane was not detected in the method blank above the method detection limit (MDL).

1.6 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were analyzed at the proper frequency for the samples analyzed (one pair per batch of 20 samples). A batch MS/MSD pair was reported. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the samples.

1.7 Laboratory Control Sample (LCS)

LCS samples were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was analyzed. The result for the LCS was within the laboratory specified acceptance criteria for recovery.

1.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria

1.9 Equipment Blank

An equipment blank was not collected with the sample set.

1.10 Field Duplicate

A field duplicate sample was not collected with the sample set.

1.11 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1b.

1.12 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

2.0 ANIONS AND ALKALINITY

One groundwater sample was analyzed for anions (chloride, nitrate, nitrite and sulfate) by EPA method 300.0 and total and phenolphthalein alkalinity by Standard Method 2320B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike
- ✓ Laboratory Duplicate
- ✓ Laboratory Control Sample
- ✓ Equipment Blank
- ✓ Field Duplicate
- ✓ Compound Quantitations
- ⊗ Sensitivity
- ✓ Electronic Data Deliverables Review

2.1 Overall Assessment

The anion and alkalinity data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

2.2 Holding Times

The holding time are listed below. The holding times were met for the sample analyses.

Test Method	Holding Time (from collection to analysis)
Total and phenolphthalein alkalinity	14 days
Sulfate and chloride by EPA Method 300.0	28 days
Nitrate and Nitrite by EPA Method 300.0	48 hours

2.3 Initial Calibration

The initial calibration data for the anions met the method requirements.

2.4 Initial and Continuing Calibration Verification (ICV and CCV)

The percent recoveries in the ICVs and CCVs were within the method acceptance limits.

2.5 Initial and Continuing Calibration Blanks (ICB/CCB)

ICBs and CCBs were analyzed at the proper frequency. The parameters were not detected in the ICBs and CCBs above the MDLs.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank each was reported for the anion and alkalinity data. The anions were not detected in the method blank above the MDLs. An estimated concentration of total alkalinity greater than the MDL and less than the reporting limit (RL) was detected in the method blank. Since the total alkalinity concentrations were greater than the RL and phenolphthalein alkalinity was not detected in the associated samples, no qualifications were applied to the data.

2.7 Matrix Spike

MSs were analyzed at the proper frequency for the samples analyzed (one per batch of 20 samples). Batch MSs were reported for anions and alkalinity. Since these are batch QC, the results do not affect the sample in this data set and qualifications were not applied to the sample.

2.8 Laboratory Duplicate

Laboratory duplicates were analyzed at the proper frequency for the samples analyzed (one per batch of 20 samples). Batch laboratory duplicates were reported for anions and alkalinity. Since these are batch QC, the results do not affect the sample in this data set and qualifications were not applied to the.

2.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS each was reported for the anion and alkalinity data. The results for the LCSs were within the laboratory specified acceptance criteria for recovery.

2.10 Equipment Blank

An equipment blank was not collected with the sample set.

2.11 Field Duplicate

A field duplicate sample was not collected with the sample set.

2.12 Sensitivity

The samples were reported to the MDLs. Elevated nondetect results were reported for nitrate and nitrite due to the dilutions analyzed because of the concentrations of chloride and sulfate in the samples.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1b, with the exception of alkalinity. The achievable laboratory MDLs listed in QAPP Table 1b for alkalinity was 0.01 mg/L as CaCO₃; the laboratory MDL was 0.7 mg/L as CaCO₃.

2.13 Electronic Data Deliverables Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

Memorandum

Date: 15 October 2013
To: Derek Tomlinson
Michelle Mirigliano
From: Mary Tyler
CC: J. Caprio
Subject: **Stage 4 Data Validation - Level IV Data Deliverable –
Volatile Organic Compounds by EPA Methods 5030B/8260B –
Eurofins Lancaster Laboratories Sample Delivery Group (SDG)
NPF01**

SITE: North Penn 5 – Colmar, PA

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of eight water samples. one matrix spike/matrix spike duplicate (MS/MSD) pair, one field duplicate sample, one field blank and one trip blank, collected on September 5, 2013, as part of the North Penn 5-Colmar, Pennsylvania sampling event. Eurofins Lancaster Laboratories, Lancaster, Pennsylvania analyzed the samples for the following analytical test:

- Volatile Organic Compounds (VOCs) by EPA Method 5030B/8260B

EXECUTIVE SUMMARY

The samples were handled, prepared, and measured in the same manner under similar prescribed conditions.

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for meeting project objectives. Qualified data should be used within the limitations of the qualification.

The organic data were reviewed based on the Quality Assurance Project Plan (QAPP), Operable Unit 2 North Penn Area 5 Superfund Site, Unilateral Administrative Order (UAO), Docket No. CERCLA-03-2012-0205DC, March 2013, the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (USEPA-540-R-

08-01), as well as by the pertinent methods referenced by the data package and professional judgment.

The following samples were analyzed in the data set:

Laboratory ID	Client ID
7187094	Trip Blank
7187095	TW44A-090513
7187096	TW44A-090513 MS
7187097	TW44A-090513 MSD
7187098	TW45-090513
7187099	TW46-090513
7187100	TW47-090513
7187101	DUP01-090513
7187102	TW51-090513

Laboratory ID	Client ID
7187103	TW48-090513
7187104	TW50-090513
7187105	TW49-090513
7187106	FB-090513
71873017	TW50-090513 Trial #1
71873018	TW50-090513 Trial #2

The samples were received at the laboratory at temperatures within the criteria of 0-6°C. No sample preservation issues were noted by the laboratory.

Sample TW50-090513 was analyzed three times and reported as samples TW50-090513, TW50-090513 Trial #1 and TW50-090513 Trial #2. The client requested the reanalyses.

1.0 VOLATILE ORGANIC COMPOUNDS

Eight water samples, one MS/MSD pair, one field duplicate sample, one field blank and one trip blank were analyzed for VOCs per EPA Method 5030B/8260B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ⊗ Continuing Calibration Verification
- ✓ Method Blanks
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ⊗ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Blank
- ✓ Trip Blank

- ⊗ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in this package are considered to be usable for meeting project objectives. The results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%.

1.2 Holding Time

The holding time for a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs). The %RSDs of the calibration check compounds (CCCs) met the method criteria of less than or equal to 30% and the minimum average RRFs for the system performance check compounds (SPCCs) were above the method and validation criteria.

For the target analytes, the average RRFs and the %RSDs were within the method and validation criteria for the target compounds or the coefficient of determination (r^2) was greater than or equal to 0.990 for the curve fit calibrations.

1.5 Continuing Calibration Verification (CCV)

For the target analytes, the CCVs were performed at the required frequency. The CCV RRFs met the method and validation criteria.

The percent differences (%Ds) or % drift between the RRFs in the initial and continuing calibration standards for the target analytes were within the method and validation acceptance criteria of less than or equal to 20% for CCCs and the validation criteria of 50%D or drift for 1,4-dioxane, 40% D or drift for poor performing compounds and 25% D or drift for the non-CCC compounds, with the following exceptions.

The CCV analyzed on 9/6/13 and associated with samples TW44A-090513, TW44A-090513 MS, TW44A-090513 MSD, TW45-090513, TW46-090513 and TW47-090513 had %Ds outside the validation criteria for cyclohexane (30%D) and methylcyclohexane (32%D), both with low biases. Therefore, the undetected values of cyclohexane and methylcyclohexane in the associated samples were UJ qualified as estimated less than the method detection limits (MDLs). No qualifications were applied to the MS/MSD pair results based on the CCV results.

The CCV analyzed on 9/9/13 and associated with samples Trip Blank, FB-090513 and DUP01-090513 had %Ds outside the validation criteria for 1,2,4-trichlorobenzene (35%D) and 1,2,3-trichlorobenzene (36%D), both with low biases. Therefore, the undetected values of for 1,2,4-trichlorobenzene and 1,2,3-trichlorobenzene in the associated samples were UJ qualified as estimated less than the MDLs.

Sample ID	Compound	Laboratory Concentration (µg/L)	Laboratory Flag	Validation Concentration (µg/L)	Validation Qualification*	Reason Code**
TW44A-090513	Cyclohexane	2.0	U	2.0	UJ	9
TW44A-090513	Methylcyclohexane	1.0	U	1.0	UJ	9
TW45-090513	Cyclohexane	2.0	U	2.0	UJ	9
TW45-090513	Methylcyclohexane	1.0	U	1.0	UJ	9
TW46-090513	Cyclohexane	2.0	U	2.0	UJ	9
TW46-090513	Methylcyclohexane	1.0	U	1.0	UJ	9
TW47-090513	Cyclohexane	2.0	U	2.0	UJ	9
TW47-090513	Methylcyclohexane	1.0	U	1.0	UJ	9
Trip Blank	1,2,4-Trichlorobenzene	1.0	U	1.0	UJ	9
Trip Blank	1,2,3-Trichlorobenzene	1.0	U	1.0	UJ	9
FB-090513	1,2,4-Trichlorobenzene	1.0	U	1.0	UJ	9

Sample ID	Compound	Laboratory Concentration (µg/L)	Laboratory Flag	Validation Concentration (µg/L)	Validation Qualification*	Reason Code**
FB-090513	1,2,3-Trichlorobenzene	1.0	U	1.0	UJ	9
DUP01-090513	1,2,4-Trichlorobenzene	1.0	U	1.0	UJ	9
DUP01-090513	1,2,3-Trichlorobenzene	1.0	U	1.0	UJ	9

U-not detected at or above the stated MDL

*Validation qualifiers are defined in Attachment 1 at the end of this report

**Reason codes are defined in Attachment 2 at the end of this report

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Six method blanks were reported with the data (batches L132521AA, N132491AA, N132541AA, T132521AA, T132851AA and N132591AA). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

A sample set specific MS/MSD pair, using sample TW44A-090513, was reported. The MS/MSD pair had recovery and relative percent difference (RPD) results within the QAPP specified acceptance criteria, with the following exceptions.

The MS recovery of methylcyclohexane was low and outside the QAPP specified acceptance criteria (71%, limits 80-156%); the MSD recovery of trichloroethene was high and outside the QAPP specified acceptance criteria (135%, limits 88-133%). Therefore, based on professional and technical judgment, the undetected value of methylcyclohexane was UJ qualified as estimated less than the MDL and the concentration of trichloroethene was J qualified as estimated in sample TW44A-090513.

A batch MS/MSD pair was also reported. Since these are batch QC, the results do not affect the samples in this data set and qualifications were not applied to the samples.

Sample ID	Compound	Laboratory Concentration (µg/L)	Laboratory Flag	Validation Concentration (µg/L)	Validation Qualification	Reason Code
TW44A-090513	Methylcyclohexane	1.0	U	1.0	UJ	4
TW44A-090513	Trichloroethene	5.0	J	5.0	J	4

U-not detected at or above the stated MDL

J-estimated concentration greater than the MDL and less than the reporting limit (RL)

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs and four LCS/LCSD pairs were reported. The results for the LCSs and LCS/LCSD pairs were within the laboratory specified acceptance criteria for recovery and RPD, with the following exceptions.

The LCS recoveries associated with samples TW44A-090513, TW44A-090513 MS, TW44A-090513 MSD, TW45-090513, TW46-090513 and TW47-090513 were low and outside the laboratory specified acceptance criteria for cyclohexane (62%, limits 66-36%) and methylcyclohexane (68%, limits 71-132%). Therefore, based on technical and professional judgment, the undetected values of cyclohexane and methylcyclohexane in the associated samples were UJ qualified as estimated less than the MDLs. No qualifications were applied to the MS/MSD results based on the LCS results.

Sample ID	Compound	Laboratory Concentration (µg/L)	Laboratory Flag	Validation Concentration (µg/L)	Validation Qualification	Reason Code
TW44A-090513	Cyclohexane	2.0	U	2.0	UJ	5
TW44A-090513	Methylcyclohexane	1.0	U	1.0	UJ	5
TW45-090513	Cyclohexane	2.0	U	2.0	UJ	5
TW45-090513	Methylcyclohexane	1.0	U	1.0	UJ	5
TW46-090513	Cyclohexane	2.0	U	2.0	UJ	5
TW46-090513	Methylcyclohexane	1.0	U	1.0	UJ	5
TW47-090513	Cyclohexane	2.0	U	2.0	UJ	5
TW47-090513	Methylcyclohexane	1.0	U	1.0	UJ	5

U-not detected at or above the stated MDL

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Blank

A field blank, FB-090513, was collected with the sample set. VOCs were not detected in the field blank above the MDLs.

1.11 Trip Blank

A trip blank, Trip Blank, accompanied the samples. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Duplicate

One field duplicate sample, DUP01-090513, was collected with the sample set. Acceptable precision ($\leq 25\%$ RPD) was demonstrated between the field duplicate and the original sample, TW-47 090513, with the following exception.

The RPD for trichloroethene was $>25\%$; therefore, based on professional and technical judgment, the concentrations of trichloroethene in the field duplicate pair were J qualified as estimated.

Sample ID	Compound	Laboratory Concentration (µg/L)	Laboratory Flag	RPD	Validation Concentration (µg/L)	Validation Qualification	Reason Code
TW47-090513	cis-1,2-Dichloroethene	2.0	J	NC	NA	NA	NA
DUP01-090513	cis-1,2-Dichloroethene	3.0	J		NA	NA	NA
TW47-090513	Trichloroethene	23	NA	69	23	J	7
DUP01-090513	Trichloroethene	47	NA		47	J	7
TW47-090513	The other VOCs	ND	NA	0	NA	NA	NA
DUP01-090513	The other VOCs	ND	NA		NA	NA	NA

J-estimated concentration greater than the MDL and less than the RL

NC-not calculable

NA-not applicable

1.13 Internal Standards

The internal standard areas and retention times were within method limits.

1.14 Target Compound Identifications

The target compound identifications were within the validation criteria.

1.15 Target Compound Quantitation

The compound quantitations were within the validation criteria.

1.16 Sensitivity

The samples were reported to the MDLs. No elevated nondetect results were reported.

The MDLs met the achievable laboratory MDLs listed in QAPP Table 1a.

1.17 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

- U The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.
- J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.
- UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference